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(54) **A gaming machine**

(57) A gaming machine (30) is disclosed, the machine (30) having a plurality of spinning reels (18) viewed through a flat transparent panel (32). Touch screen circuitry (34) is bonded with said panel (32) and forms an array of "touch points" or data inputs by which game operation can be effected.

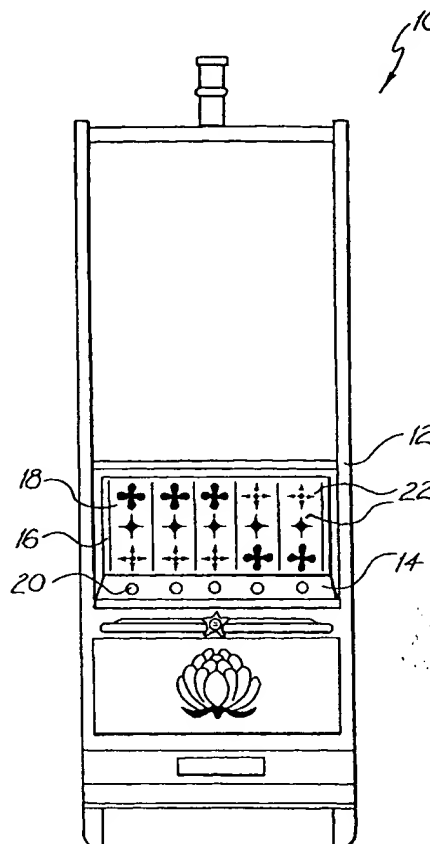


FIG. 1

EP 0 789 338 A1

Description

Field of the Invention

This invention relates to a gaming machine, and particularly to a gaming machine of the type for individual play that typically is known as a 'slot machine', 'fruit machine', 'poker machine', or the like. The invention particularly relates to a gaming machine of the type having mechanical spinning reels (typically 3 to 5 in number) that, in the play of a game, are set spinning by the player and after a predetermined period of time come to a halt, with the result of the play depending upon the displayed combination of the indicia on each reel along horizontal and/or diagonal 'win lines'.

Background of the Invention

Mechanical spinning reel gaming machines are well known, and are commonly referred to within the industry as 'stepper' machines because of being implemented by use of electrical stepper motors. Mechanical reel gaming machines are operable by player-activated pushbutton controls and/or a mechanical arm.

Gaming machines that utilise a video monitor to graphically represent the spinning reels also are well known. Such gaming machines similarly incorporate pushbutton controls, although more recently provide for touch screen control by means of controls bonded to the outer surface of the video monitor. There are difficult technical problems associated with bonding touch screen controllers to curved video monitor screens, requiring the use of packing materials at the edge margins and sophisticated data processing techniques to ensure a regular array of touchable screen 'points' and linearity between such points.

Even though video gaming machines utilise more technologically advanced component parts, there still is a significant demand amongst players of gaming machines for the older-style spinning reel machine.

The present invention broadly provides a mechanical spinning reel gaming machine that incorporates touch screen controls.

Summary of the Invention

Therefore, in one broad form, the invention discloses a gaming machine comprising one or more mechanical spinning game reels, a flat transparent panel located in front of the reels and through which the reels can be viewed, touch screen circuitry bonded to the flat panel, and control means for receiving signals from the touch screen circuitry and controlling the play of a game, including spinning of the reels.

In one preferred form, the touch screen circuitry can be bonded to the exterior surface of the panel. Alternatively, the touch screen circuitry can be applied to the interior surface of the panel. The gaming machine can

be mounted in a cabinet or housing, with the panel forming a component part of the exterior surface of the cabinet or housing.

In a particularly preferred form, a graphical transfer also can be attached to the panel. The transfer most preferably will be attached to the interior surface of the panel.

The invention further discloses a gaming machine assembly comprising a flat transparent panel and touch screen circuitry applied to a surface of the panel.

A particular advantage of the invention arises for the gaming machine manufacturer, in that there is great flexibility in the configuration of mechanical spinning reel machines that was not otherwise easily achievable. Furthermore, there are significant commercial advantages for the manufacturer given that it is believed there will be great player acceptability of gaming machines embodying the invention. It is also believed that there will be savings in the manufacturing unit cost of such a gaming machine because the cost of implementation of the touch screen circuitry will be less than the cabinet work, circuitry and components of the conventional pushbutton controls that are replaced.

Brief Description of the Drawings

An embodiment of the invention now will be described with reference to the accompanying drawings, in which:

Fig. 1 is a front view of a conventional mechanical spinning reel gaming machine;

Fig. 2 is a schematic block diagram of a gaming machine embodying the present invention;

Fig. 3 is a cross-sectional view of the screen of the gaming machine of Fig. 2;

Fig. 4 is a front view of the touch screen of Fig. 3;

Figs. 5 and 6 show the mechanical arrangement of the touch screen circuitry applied to the flat screen of the gaming machine; and

Figs. 7a to 7b are component schematic block diagrams of the touch screen controller unit.

Description of Preferred Embodiments and Best Mode

Fig. 1 shows a conventional (prior art) mechanical spinning reel gaming machine 10 that includes a housing (or cabinet) 12, a control panel 14, and a front flat screen 16, usually fabricated from glass or a transparent plastics material, and behind which (ie. inside the cabinet) is located the mechanical spinning reel assembly 18. The operation of the gaming machine 10 is by an electronic controller (not shown) located within the cabinet 12 and having connection with the control panel 14 and the spinning reel assembly 18.

As is well known, the play of the gaming machine 10 occurs by the player typically selecting the number

of units to be wagered by means of one(s) the pushbuttons 20, and possibly also the number of "win lines" to be activated, followed by activation of the "play" pushbutton. The controller then causes the individual reels 22 to be set into spinning motion and to stop at predetermined times, with the outcome of that player of the game being represented by the indicia appearing along the win line(s).

Referring now to Figs. 2-4, a gaming machine 30 embodying the invention will now be described. As with a conventional mechanical spinning reel gaming machine, the present gaming machine 30 has a flat front screen 16. As particularly shown in Fig. 3, the flat screen 16 has bonded to it touch screen circuitry 34, in this case conveniently being to the side of the glass 16 external of the cabinet 12. The configuration and bonding process will presently be described.

The rear side of the flat screen 16 has attached to it an adhesive graphic transfer 36. The location of a graphical display 38 behind the transfer 36 can be best seen in Fig. 3. As particularly shown in Fig. 4, a player of the gaming machine 30 is presented with a view through the flat screen 16 of the transfer 36 displaying indicia/icons that are co-located with particular 'touch points' of the touch screen assembly 34 that correspond with the illustrated function (for example "collect", "reserve", etc). Two lower window portions 40, 42 of the graphical transfer 36 allow the graphical display 38 to be viewed, by which information concerning available credits and other game functions, instructions or advertising (for example) can be presented to the player. Five upper windows 44-52 allow each of the spinning reels 18 to be viewed by the player.

Therefore, in play of the gaming machine 30, a player presses the screen 32 at a 'touch point' in the region of the desired displayed indicia/icons to effect the respective machine operation, that action being signalled by the touch screen assembly 34 to a game controller, as presently will be described. The game controller then causes the reels 18 to spin, stopping the reels after a predetermined time and displaying or otherwise indicating to the player the result of that play of the game.

Returning to the schematic block diagram of Fig. 2, the touch screen assembly 34 connects to a touch screen controller unit 60 by an interconnecting cable 62 carrying analog data. The controller can be such as the present applicant's assembly No. 754-239-00 controller. In turn, the touch screen controller connects with a game microprocessor assembly 64 on a bus 66 that operates under a proprietary serial protocol, known as "Netplex". The game microprocessor assembly 64 can be such as the present applicant's 80960 game controller (assembly no. 755-085-00). The game microprocessor assembly 64 has control over the stepper motors and sensor optics 65 for the spinning reel assemblies and the graphical display 38. Yet further, the microprocessor assembly 64 has connection with I/O board 68 by a cable 70 under control of a proprietary interface known as "Senet". The

I/O board 68 can be such as the present applicant's assembly No. A33-006-14 I/O board. The I/O board 68 has control over the machine peripheral equipment, including buttons, lights and electromechanical meters.

Representative details of the touch screen assembly 34 and touch screen controller 60 are included in US Patent Application Serial No. 08/294,227 (equivalent to Australian Patent Application No. 24957/95 owned by the parent corporation of the present applicant), the contents of which are incorporated herein by cross-reference.

Referring to Figs. 5 and 6, fabrication of the touch screen assembly 36 applied to the flat screen 16 will be described. In this embodiment, the screen 16 is constructed of glass and is approximately 500 mm in length, 340 mm in height and 5 mm thick. Four electrodes 80 are screened onto the glass panel 16 with a silver frit glass mixture. The electrodes are constructed of a conductive material suitable for the soldering of attachment wires 90-96 by use of a low temperature solder 82. A representative length of the top and bottom electrodes is 290 mm, with a separation of 320 mm. The length of the left side and right side electrodes is 245 mm with a separation of 480 mm.

A conductive coating of Indium Tin Oxide (ITO) 84 of approximately 700 ohms/sq is applied over the top of the electrodes 80 by a vacuum deposition process. A protective hard coat of silicon dioxide 80 then is placed over the ITO layer to protect the ITO layer 84 from scratching and to provide electrical insulation. The coating preferably is to a thickness of 20,000 Angstroms.

For a configuration of the dimensions described, the useable area of the flat screen 16 for touch screen operation is about 25 cm x 40 cm, this being the area between the electrodes. The touch screen assembly 34 of the dimensions described typically results in a 5 x 7 array of discrete 'touch points'. Finally, an edge shielding (not shown) is placed around the perimeter of the glass screen 16 to isolate the touch screen assembly 34 from surrounding conductive material, and further to reduce the incidence of leakage currents that might otherwise cause spurious signals that might be mistaken for a "touch".

Referring now to Figs. 7a-7f, further details of the touch screen controller unit 60 will be given. The touch screen assembly 34 connects with the touch screen controller unit 60 by a cable 62 as has previously been described. The cable can be a four conductor shielded cable, such as the part no. 9534 manufactured by Belden Cable of the United States.

As particularly shown in Fig. 7a, the electrodes 80 each are A.C. coupled to a differential amplifier stage 100 via 10 uF capacitors. The differential amplifier stage consists of four separate amplifiers. The gain of each amplifier is 2000. The amplifiers amplify the difference between the 11.0592 kHz signal sent to the 'Screen Drive 0' (described presently) and the signal returning from the touch screen circuitry 34. The output of the dif-

ferential amplifier is A.C. coupled to the four Bessel band pass filters 102-108. The gain of the Bessel band pass filter stage is about 6, and the stage filters out any signal that is not within the pass band frequency of the filter. The center of the Bessel band pass filter stage is set to the same frequency as the screen drive 11.0592 kHz.

As shown in Fig. 7f, a Dallas 80C320 microprocessor crystal 16 is divided down from 22.1184 MHz into two frequencies. One of the frequencies is used to clock the Bessel band pass filter stage. This frequency is 100 times the center frequency of the Bessel band pass filter stage, and is 1.10592 MHz. The other frequency is 11.0592 kHz. This frequency is A.C. coupled to the auto gain control circuitry 110 shown in Fig. 7e which is controlled by a Dallas 80C320 microprocessor 130. The microprocessor changes the gain of the auto gain control circuitry 110 so proper screen drive is accomplished. The output of the auto gain control circuitry 110 is connected to a second order Butterworth low pass filter 112, that is used to remove some of the higher order harmonics from the auto gain control circuitry 110. The -3dB point on the low pass filter is set at approximately 11 kHz. The signal out of the low pass filter 112 is A.C. coupled to 'Screen Drive 0', and D.C. coupled to the differential amplifier stage 100.

The four outputs from the Bessel band pass filter stages 102-108 are connected to a channel multiplexer 120, as shown in Fig. 7c. The microprocessor 130 controls the output of the channel multiplexer, which is connected to an analog buffer 122. The analog buffer has a gain of -1, and its output is connected to a analog-to-digital converter 124.

As shown in Fig. 7f, the microprocessor 130 is supported by several I.C.s. The system RAM 132 is an 8k by 8 in which the boot program is stored. The system program is stored in two different I.C.s. The size of the EPROM is 32k by 8, however only the first 8k by 8 bites are used. The main program and calibration data is stored in the FLASH memory I.C. 136. The watch dog timer I.C. 138 is used to reset the microprocessor 130 if it fails to execute the instructions properly. The interface 140 of the "NETPLEX" is isolated, and is the present applicant's 960 NETPLEX Interface. Additional I.C.s 142, 144 are used for memory decoding, address latching, and signal conditioning.

Operation of the gaming machine 30 otherwise proceeds as is conventionally the case.

Claims

1. A gaming machine comprising one or more mechanical spinning game reels; a flat transparent panel located in front of the reels and through which the reels can be viewed; touch screen circuitry bonded to the flat panel; and control means for receiving signals from the touch screen circuitry and

controlling the play of a game, including spinning of the reels.

2. A gaming machine as claimed in claim 1, wherein said touch screen circuitry includes at least one pair of electrodes located at opposed edge margins of said panel, said electrodes being driven to produce an array of discrete regions on said panel defining input points.
3. A gaming machine as claimed in claim 2, wherein said touch screen circuitry is applied to the exterior surface of said panel.
4. A gaming machine as claimed in claim 3, further comprising a graphical transfer attached to the interior surface of said panel, the transfer permitting a view of said reels.
5. A gaming machine as claimed in any one of claims 1 to 4 further comprising a cabinet housing said reels and said control means, and wherein said panel forms a component part of the exterior surface of said cabinet.
6. A gaming machine assembly comprising a flat transparent panel and touch screen circuitry applied to a surface of said panel.
7. A gaming machine assembly as claimed in claim 6, wherein said touch screen circuitry includes at least one pair of electrodes located at opposed edge margins of said panel, said electrodes being driven to produce an array of discrete regions on said panel defining input points.
8. A gaming machine assembly as claimed in claim 7, wherein said touch screen circuitry is applied to the exterior surface of said panel.

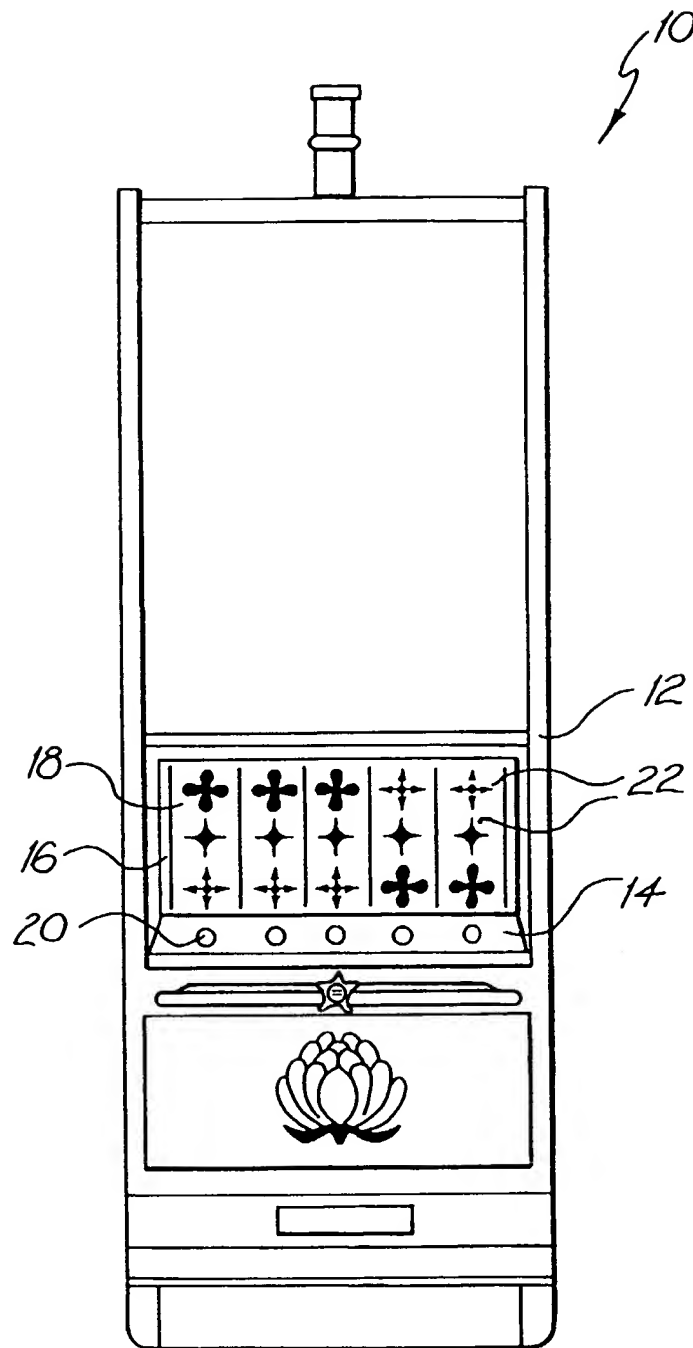


FIG. 1

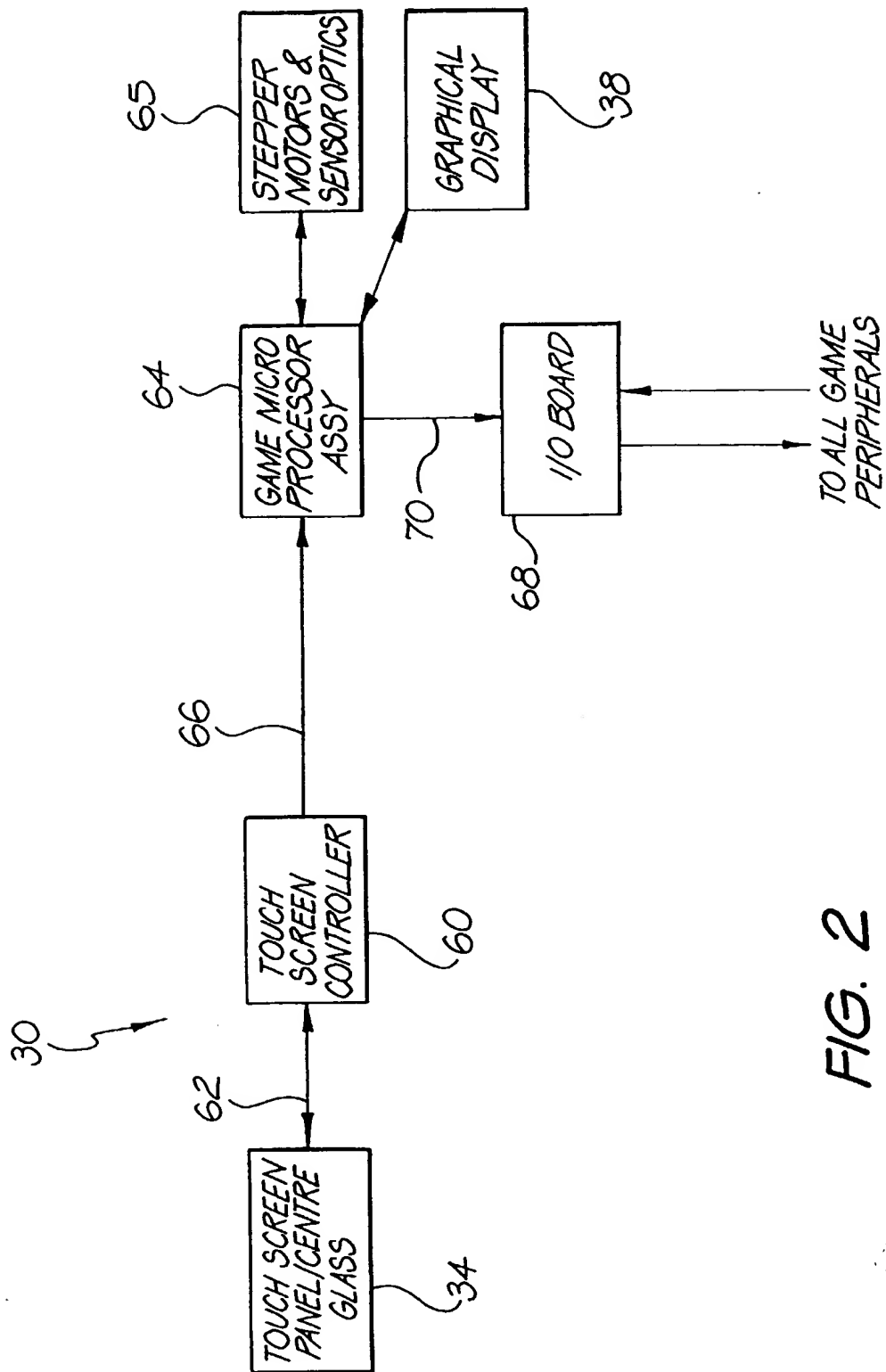


FIG. 2

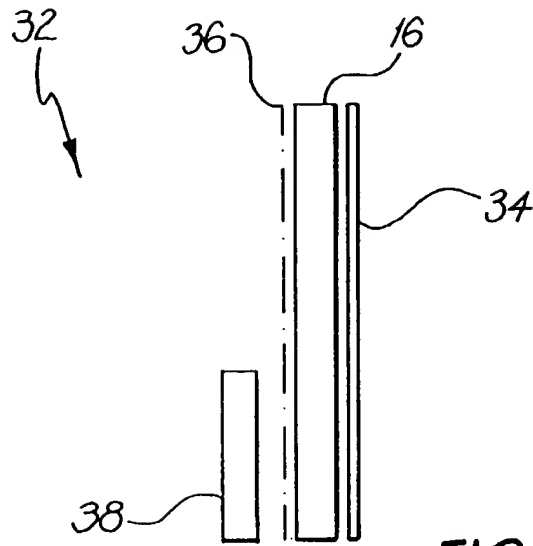


FIG. 3

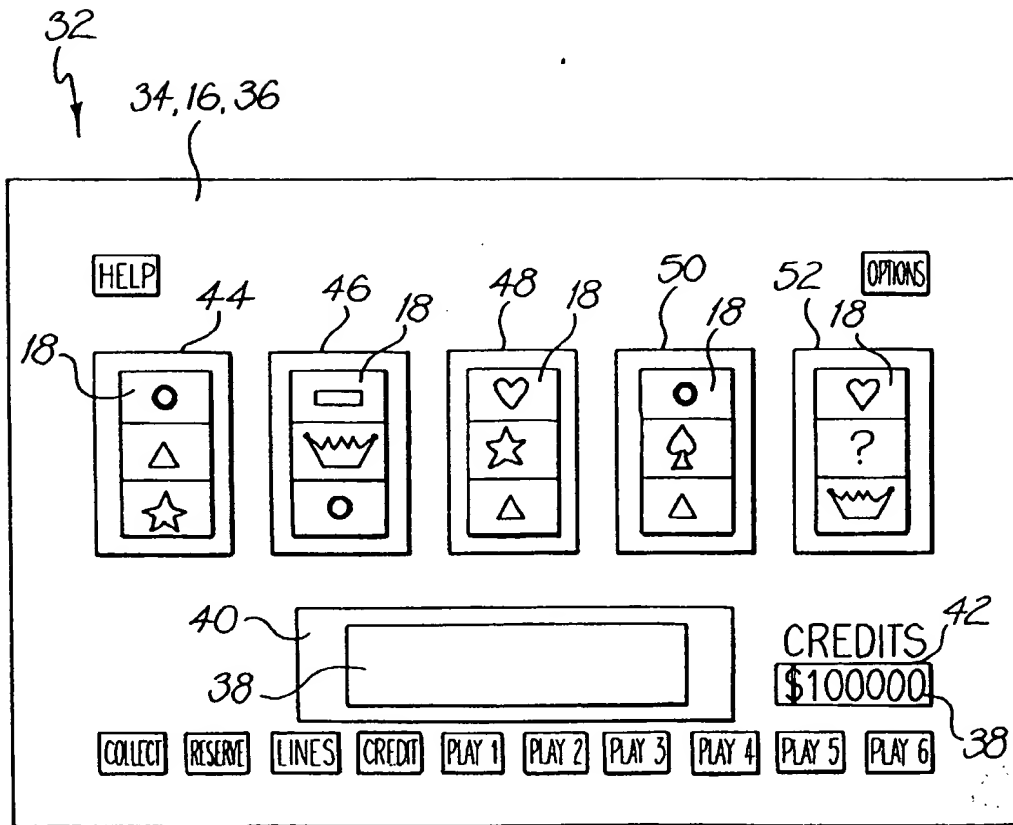


FIG. 4

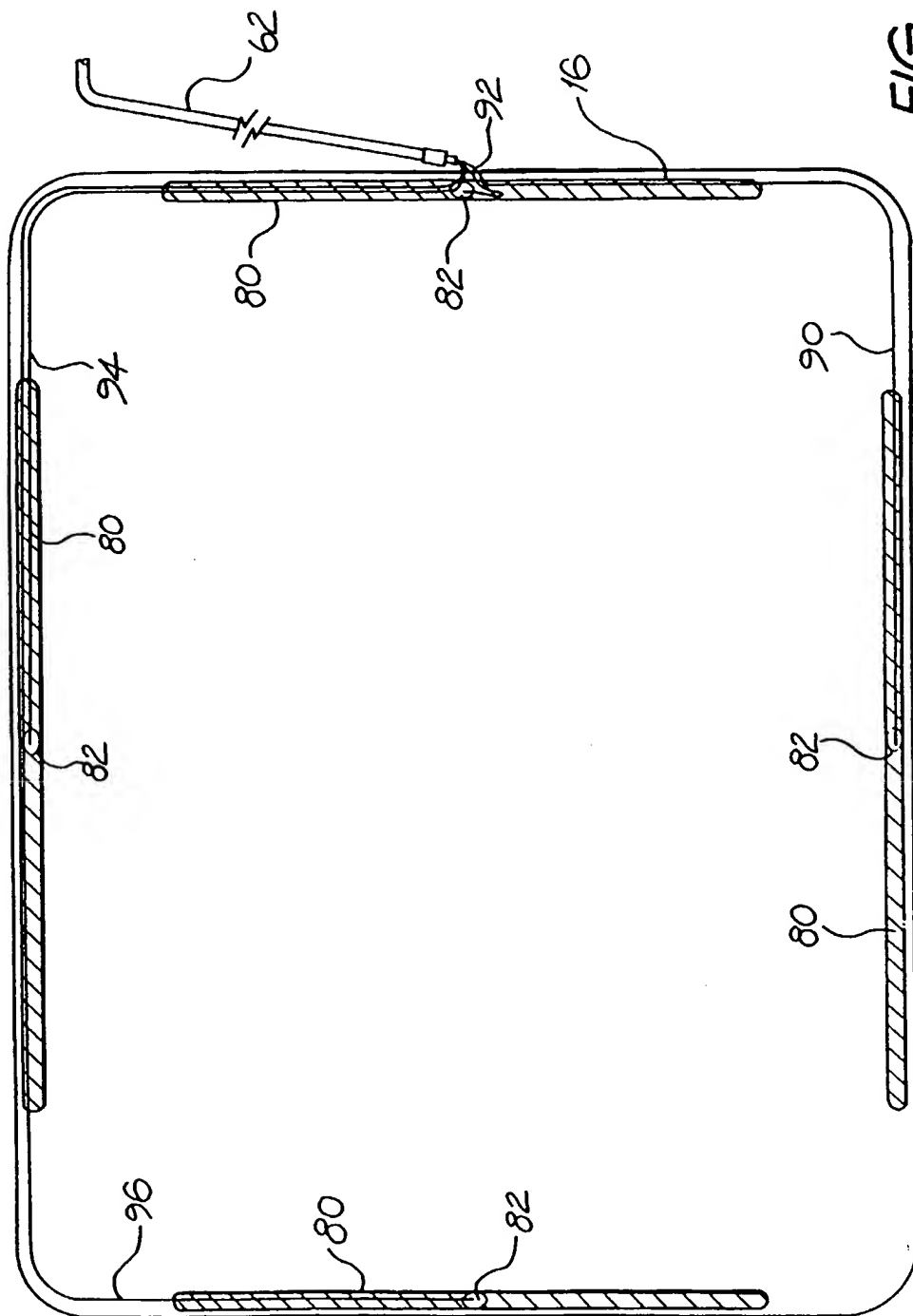


FIG. 5

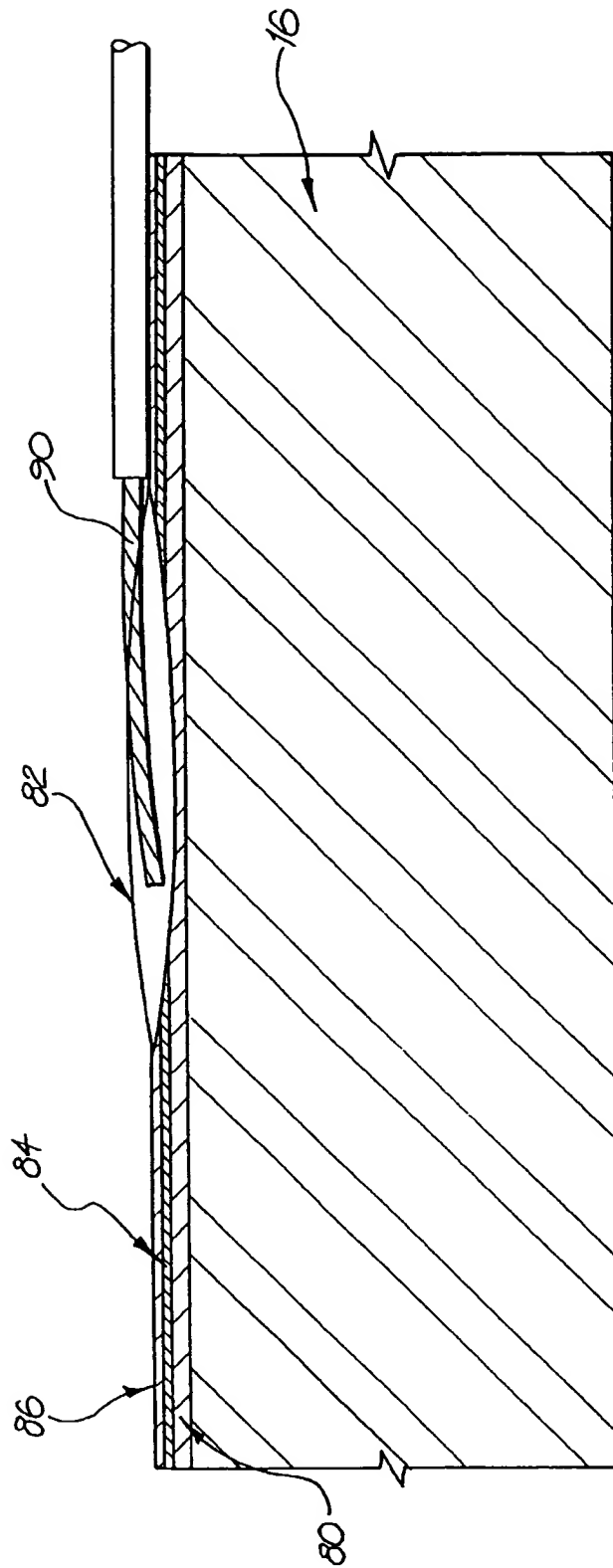


FIG. 6

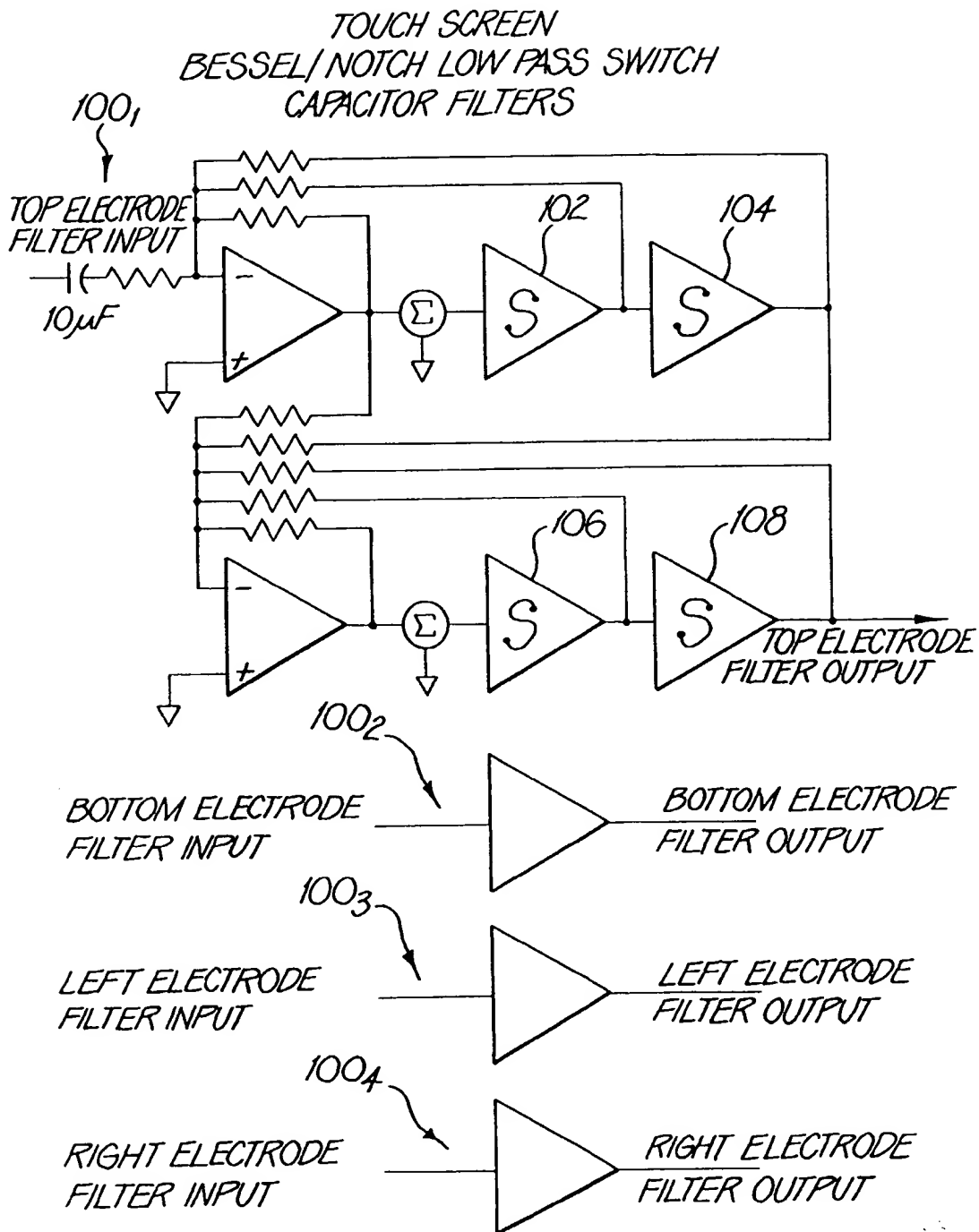


FIG. 7a

TOUCH SCREEN POWER
SUPPLY BLOCK DIAGRAM

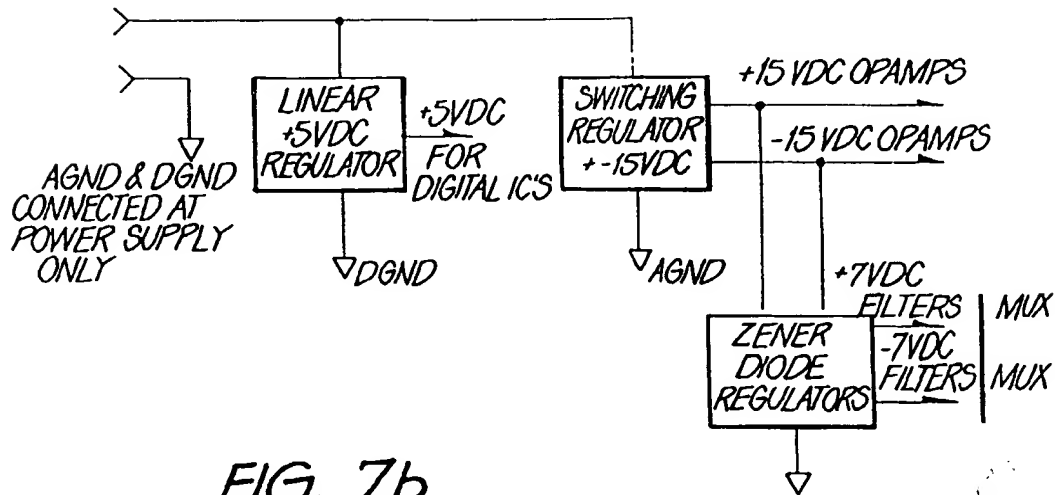
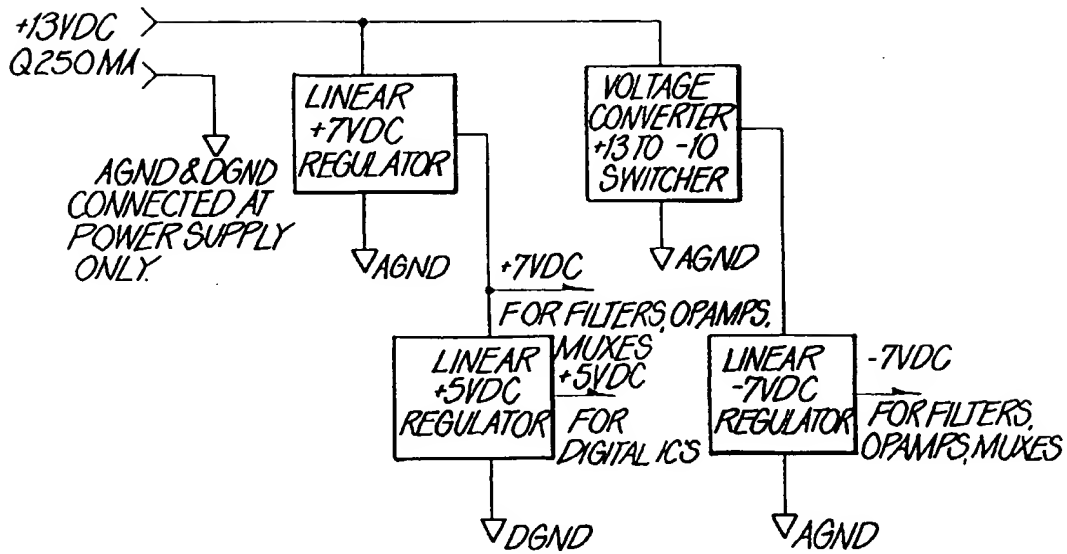


FIG. 7b

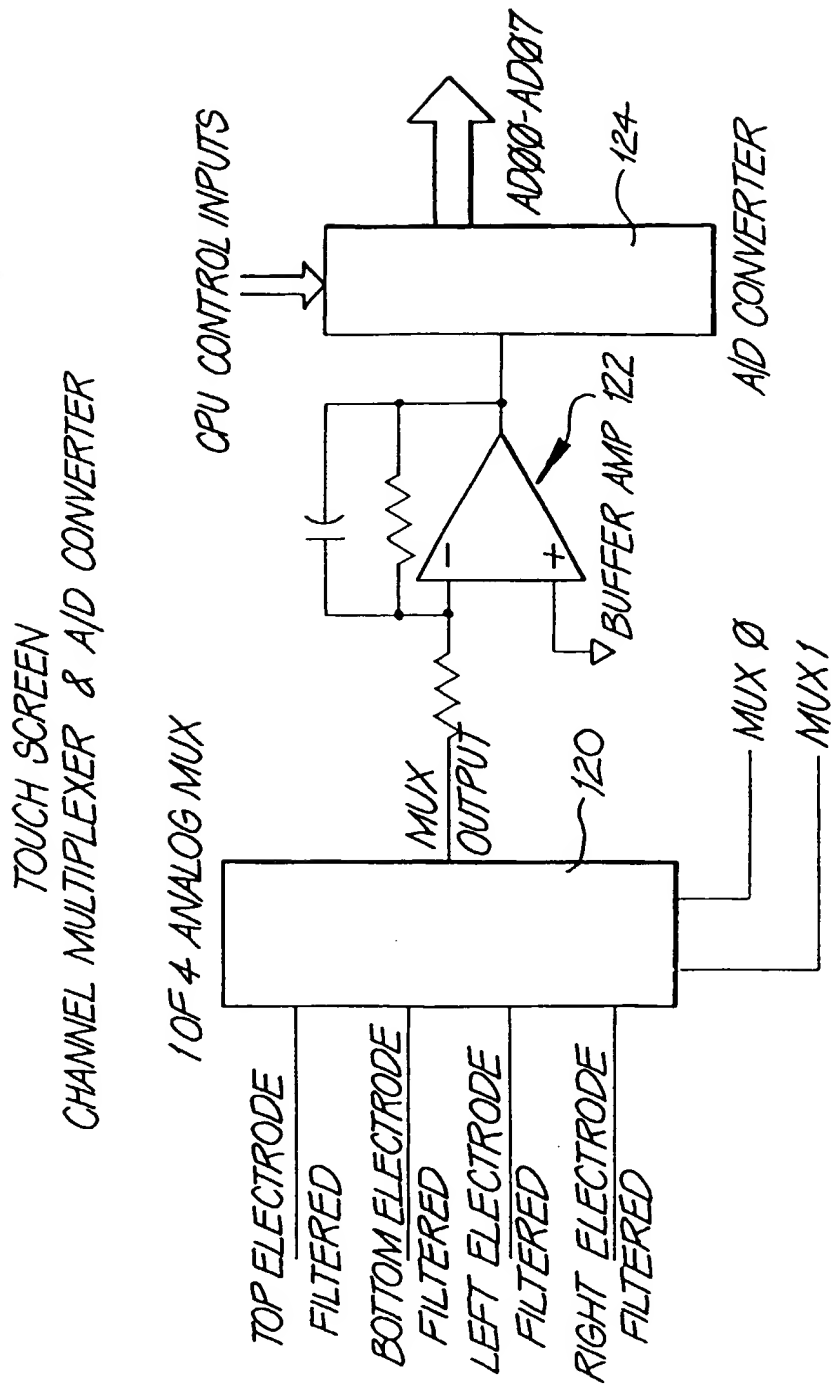
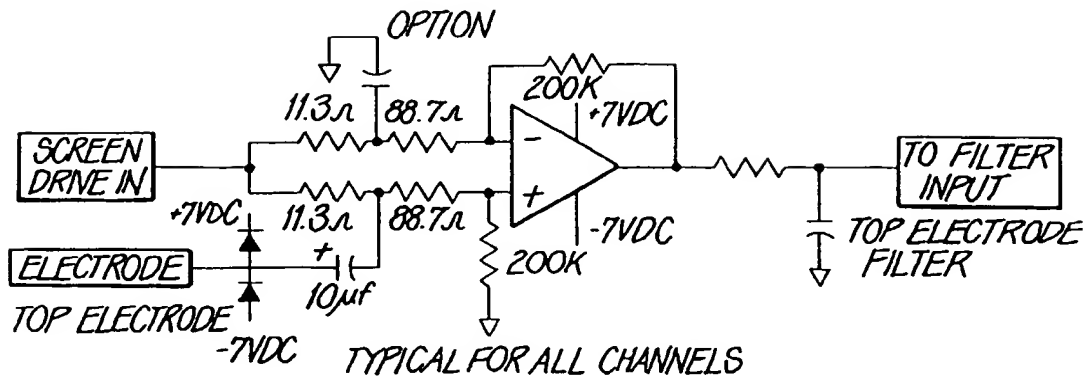


FIG. 7C

TOUCH SCREEN INPUT OPAMPS



(BOTTOM ELECTRODE)



(LEFT ELECTRODE)



(RIGHT ELECTRODE)



FIG. 7d

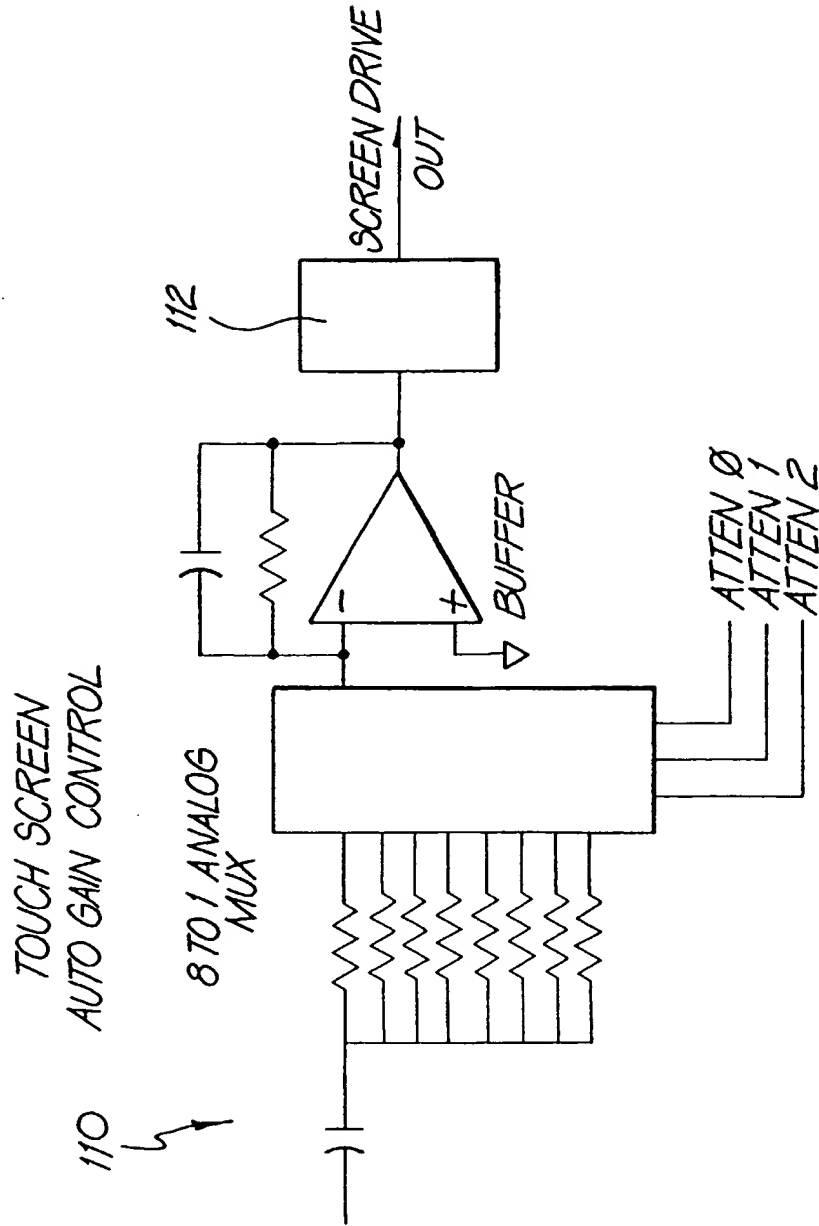


FIG. 7e

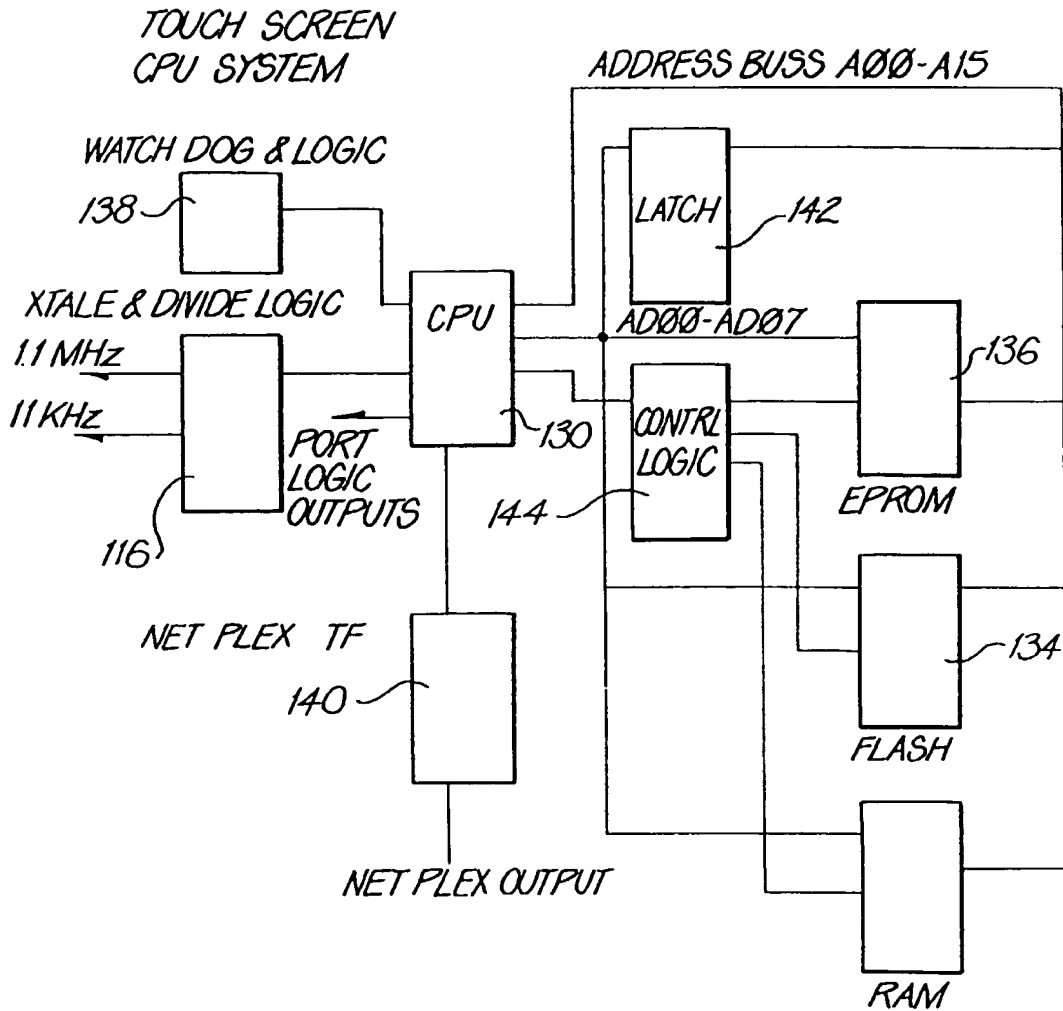


FIG. 7f



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 30 0735

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	GB 2 251 112 A (BARCREST) * the whole document *	1,5,6 2,3,7,8	G07F17/32
Y A	EP 0 544 300 A (SHARP) * column 1, line 16 - column 2, line 42; figures 6-10 *	2,3,7,8 1,6	
X A	EP 0 588 625 A (BARCREST) * abstract; figure *	6 1,3,5,8	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			G07F G06K
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 21 May 1997	Examiner Neville, D
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone V : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

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